

Serial Number 10/666,102
Docket Number YOR920030026
Amendment2

Amendments to the Specification:

Please replace the title of the specification with the following amended title:

**METHOD FOR DETECTING PROGRAM PHASES WITH PERIODIC CALL-STACK
SAMPLING DURING GARBAGE COLLECTION**

Please replace paragraph [0001] with the following amended paragraph:

[0001] The research was sponsored by the United States Government, under contract number NBCH020056. The period of performance was from Jun. 17, 2002, through Sep. 16, 2003. The name of the project is: High Productivity Computing System (HPCS). The United States Government has certain rights in this invention.

Please replace paragraph [0005] with the following amended paragraph previously submitted in applicant's Preliminary Amendment:

[0005] Many computer programs execute a sequence of *phases* during execution; during each phase, the program executes some well-defined task. Indeed, since the inception of computer programming, programs have been described in terms of *flow charts*, which show graphical representations of various program phases and transitions among them. A phase is a method or function performed by a computer program. A phase begins when the program calls a method or process and completes when the result of the method is obtained.

Please replace paragraph [0017] with the following amended paragraph:

[0017] Referring to FIG. 1, there is shown a flow chart illustrating a method 100 for detecting phases in a computer program running at least one thread according to an embodiment of the invention. The method is performed with a system that comprises a plurality of stacks each

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comprising at least one stack frame. Each stack frame comprises an activation counter. In step 102 an activation count is associated with each frame. Then in step 104 the activation count is zeroed whenever the system creates a new stack frame. Next in decision 106 the system determines whether an interval has transpired during program execution. This can be done using a system clock. If the interval has not transpired the process continues until the interval transpires. Once the interval has transpired, in step 108 the program walks (i.e. examines the content of) each thread's stack and increments the activation count for each frame. At any given time, in step 110 the system associates a phase with an activation whose activation count is non-zero. The activation count is implemented by reserving storage in each stack frame. The method 100 can further comprise the act of logging activation counts during each interval.

Please replace paragraph [0018] with the following amended paragraph:

[0018] Once a phase in a program has been detected it is advantageous to schedule performance of certain functions at the end of a phase. Among the functions that can be performed are: (1) ~~comprising~~ scheduling garbage collection after each associated phase; (2) scheduling thread switches at phase boundaries; (3) scheduling checkpoint operations after each associated phase; and (4) presenting a visualization of program phase behavior; (5) resetting profile data at program phase transitions. The method 100 can also comprise changing the return address to force the program to call a designated procedure when the frame returns.